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the spatial relationship in the panoramic region of the content of the displayed image to the content of the other displayed images; and

instructions for displaying one or more context images while an active image is displayed, each context image being at least part of an image represented by a frame of the set of temporally sequential frames of visual data.

Please enter the following new claim:

25. (New) A method as in Claim 13, wherein:

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the set of frames of visual data in which a branch point is identified is a first set of temporally sequential frames of visual data representing a panoramic region at a first time; and

the new set of frames of visual data is a second set of temporally sequential frames of visual data representing the panoramic region at a second time that is different from the first time.

REMARKS

Claims 1-24 were filed and are pending. Claims 1-24 were rejected under 35 U.S.C. § 102. Claims 1, 23 and 24 have been amended. Claim 25 has been added. Reconsideration and allowance of Claims 1-24, and allowance of Claim 25 is requested.

Rejection of Claims under 35 U.S.C. § 102

The Examiner rejected Claims 1-24 under 35 U.S.C. § 102(b) as being anticipated by Kumar et al. (U.S. Patent No. 5,963,664). Since the Kumar et al. patent issued on October 5, 1999, and the instant application was filed on March 31, 1999, the Kumar et al. patent cannot be used to reject Claims 1-24 under 35 U.S.C. § 102(b). Applicants have assumed herein that the Examiner meant to reject Claims 1-24 under 35 U.S.C. § 102(e) as being anticipated by Kumar et al.

Regarding Claims 1, 18, 23 and 24, the Examiner stated:

Kumar discloses (Fig. 2) a set of temporally sequential frames of visual data, each frame representing an image, defining a region, within a panoramic region. Further disclosed (Fig. 2) is the positioning of one or more images, with relationship to the spatial orientation of the panoramic region, while an active image is being displayed. In addition, (Fig. 1, Element 106) shows an output device, which could be any type of video display.

....

Further disclosed in Claim 24, is a readable storage medium, on which is stored one or more computer programs, for producing a visual display, of a panoramic region. Kumar discloses (Col. 4, Lines 58-61) and (Col. 5, Lines 15-17) a computer that is programmed to function as an image processing system, and a video storage and retrieval system.

As stated in Applicants' specification at page 7, lines 8-11, "[t]he invention provides a visual display of a panoramic region in which visual context (a 'context display,' ...) is provided for an active display ... displayed in a mobile display window." As further stated in Applicants' specification at page 11, lines 17-27:

After the display of a first image, successive images (active images) are generated and displayed from frames of visual data that are temporally adjacent to the frame of visual data from which the most recently displayed image was generated. If the frames of visual data have been obtained and are displayed at a sufficiently high rate, successive display of active images will produce a display in which it appears that motion occurs (if motion was occurring in the part of the panoramic region represented by the active image) in the active window (i.e., the area of the display screen in which the active image is displayed).

As further stated in Applicants' specification at page 12, line 34 to page 13, line 9:

[A]s active images are successively displayed, one or more context images (i.e., a complete or partial previously displayed image) can be retained as part of the visual display. Each context image is static. In contrast, as described above, motion can appear to occur in the active window in which the active image is displayed. Thus, in a visual display according to the invention, one or more static images provide context for an active image that, in many cases (depending upon whether motion occurred at that time in that part of the panoramic region), is a moving image.

Kumar et al. do not teach or suggest a visual display of a panoramic region in which visual context (a context display) is provided for an active display, as in Claims 1, 23 and 24 originally pending in this application. Nevertheless, Claims 1, 23 and 24 have been amended herein to emphasize and/or clarify aspects of the invention not taught by Kumar et al. Claims 1, 23 and 24 each recite, as amended, "displaying a series of active images generated from multiple temporally sequential frames of visual data" and "displaying one or more context images while an active image is displayed, each context image being at least part of an image represented by a frame of the set of temporally sequential frames of visual data." Claim 18 recites "an active

display comprising a series of active images that are generated from temporally sequential frames of visual data" and "a context display comprising one or more context images displayed while an active image is displayed, each context image being at least part of an image represented by a frame of the set of temporally sequential frames of visual data."

Kumar et al. teach, at column 3, lines 61-66:

The present invention is an image processing system that combines a plurality of images representing an imaged scene to form a three-dimensional (3D) mosaic, where the 3D mosaic contains an image mosaic representing a panoramic view of the scene and a shape mosaic representing the three-dimensional geometry of the scene.

Kumar et al. further teach, at column 5, lines 18-32:

FIG. 2 schematically depicts the input images 200_n to the system of FIG. 1 and the output 3D mosaic 202_n generated by that system in response to the input images. The input images, as mentioned above, are a series of images of a scene, where each image depicts the scene from a different viewpoint. The system aligns the images and combines them to form an image mosaic 204, e.g., a two-dimensional mosaic having the images aligned along an arbitrary parametric surface extending through all the images. In addition to the image mosaic, the system generates a shape mosaic 206 that contains the motion field that relates the three-dimensional objects within the images to one another and to the parametric surface.

Thus, Kumar et al. teach a particular way of creating a static panoramic display including three-dimensional information. Kumar et al. do not teach or suggest "an active display comprising a series of active images that are generated from temporally sequential frames of visual data," as recited in Claim 18, or "displaying a series of active images generated from multiple temporally sequential frames of visual data," as recited

in Claims 1, 23 and 24. Nor do Kumar et al. teach or suggest providing context for such an active display, i.e., Kumar et al. do not teach or suggest "a context display comprising one or more context images displayed while an active image is displayed, each context image being at least part of an image represented by a frame of the set of temporally sequential frames of visual data," as recited in Claim 18, or "displaying one or more context images while an active image is displayed, each context image being at least part of an image represented by a frame of the set of temporally sequential frames of visual data," as recited in Claims 1, 23 and 24. Therefore, Claims 1, 18, 23 and 24 are allowable over the teaching of Kumar et al.

Claims 2-17 each depend, either directly or indirectly, on Claim 1 and are therefore allowable over the teaching of Kumar et al. for at least the reasons given above with respect to Claim 1. Similarly, Claims 19-22 each depend on Claim 18 and are therefore allowable over the teaching of Kumar et al. for at least the reasons given above with respect to Claim 18. Additionally, as discussed below, many of the limitations recited in Claims 2-17 and 19-22 are neither taught nor suggested by Kumar et al.

Regarding Claim 2, the Examiner stated:

Claim 2 discloses one or more context images, being automatically displayed, in a predetermined manner. Kumar teaches (Fig. 7), (Col. 11, Lines 1-3) a hierarchical technique to register images.

Claim 2 recites that "the step of displaying one or more context images further comprises automatically displaying one or

more context images in a predetermined manner." As stated in Applicants' specification at page 4, lines 26-31:

In one embodiment of the invention, context images are automatically displayed in a predetermined manner. For example, after each image is displayed as the active image, the image can be retained, in whole or in part, on the display screen as a context image, i.e., the active image leaves a trail of context images.

"Registering images," as used by Kumar et al., refers to aligning images to create a "seamless" panoramic display and computing information regarding three-dimensional characteristics of the display (see, e.g., column 2, line 51 to column 3, line 4, column 4, lines 12-18, and column 6, lines 26-31). The hierarchical technique mentioned by Kumar et al. at column 11, line 1 is simply one example of such registration. This clearly does not teach or suggest the limitations recited in Claim 2.

Regarding Claims 3 and 4, the Examiner stated:

Claims 3-4 disclose an order, in which context images are to be displayed. Since the frames representing an image are processed sequentially, and a hierarchy for how those images are displayed, already exists, it is logical to assume that the context images would be displayed, as disclosed in Claims 3-4.

The Examiner appears not to have understood the limitations of Claims 3 and 4. Claim 3 recites that "each context image is at least part of an active image displayed prior to the display of a current active image." Claim 4 recites that "the step of displaying one or more context images further comprises displaying each image displayed after a first display of a context image." Thus, contrary to the Examiner's assertion, Claims 3 and 4 do not recite an order in which context images are to be displayed. To the extent the remainder of the Examiner's

remarks can be understood; those remarks do not appear to bear on the patentability of Claims 3 and 4. In any event, since Kumar et al. do not teach a display in which a series of images are displayed, Kumar et al. clearly do not teach or suggest the limitations recited in Claims 3 and 4.

Regarding Claims 5-12, the Examiner stated:

Kumar discloses (Col. 4, Lines 58-61) and (Col. 5, lines 15-17) a computer that is programmed to function as an image processing system, and a video storage and retrieval system. The use of computer software, and a memory, implies that past and present images can be designated, by user instruction, to perform all functions disclosed in Claims 5-12.

The Examiner appears not to have understood the limitations of Claims 5-12 and, in any event, has provided an inadequate and dismissive rationale for rejecting those claims. Moreover, contrary to the Examiner's assertion, the use of computer software and a memory does not in any way imply that past and present images can be designated by user instruction, and, in any event, such an assertion does not address the particular limitations recited in Claims 5-12.

Claim 5 recites that "the step of displaying one or more context images further comprises displaying an image designated by a user as a context image" and Claim 7 recites that the method "further compris[es] the step of designating an image as a context image in accordance with user instruction." Since Kumar et al. do not teach displaying a "context image," as that term is used with respect to Applicants' invention, Kumar et al. do not teach or suggest user designation of a context image, as recited in Claims 5 and 7. Nor do Kumar et al. teach or suggest the

particular aspects of designating and displaying a context image recited in Claims 6, 8 and 9. For example, since Kumar et al. do not teach a display in which a series of images are displayed, Kumar et al. clearly do not teach or suggest that "the step of displaying one or more context images further comprises displaying a previously displayed image designated by a user as a context image," as recited in Claim 6, or that "the step of designating further comprises designating an image as a context image at the time that the image is displayed as an active image," as recited in Claim 8. Additionally, Kumar et al. do not teach or suggest "moving the location of a context image on the display screen in accordance with user instruction," as recited in Claim 9 (and the Examiner has given no indication where such a limitation is taught or suggested by Kumar et al.).

Claim 10 recites that "one or more of the context images is designated as a clip image." Claims 11 and 12 recite further limitations regarding the use of a "clip image" in a method of Applicants' invention. As stated in Applicants' specification at page 21, lines 28-31, "'clip image' indicates a context image which, if 'selected' by a user, causes a display of successive active images (a 'clip'), beginning with the clip image, for a prescribed amount of time." The Examiner has not in any way indicated how Kumar et al. teach or suggest the use of a "clip image" (which, as can be seen, has a particular meaning with respect to Applicants' invention) and, in fact, Kumar et al. do not teach or suggest the use of a clip image.

Regarding Claim 13, the Examiner stated:

Kumar (Fig. 1) also shows the use of multiple cameras, which would provide at least two non-coincidental images, as well as a plurality of sets of temporally sequential frames, as further disclosed in Claim 13. Also disclosed in Claim 13 is the identification of a branch point, for the purpose of updating an image. Kumar discloses (Col. 17, Lines 13-33) a scene change detection scheme.

The Examiner appears not to have understood the limitations of Claim 13. A scene change detection scheme is irrelevant to consideration of the patentability of the limitations of Claim 13. Claim 13 recites "identifying a branch point in a set of frames of visual data from which active images are being displayed; when a branch point is identified, determining whether to display images generated from a new set of frames of visual data; if images are to be generated from a new set of frames of visual data, identifying a new set of frames of visual data and the frame within the new set of frames of visual data with which to begin the display of active images; and generating a display of an active image from each of multiple temporally sequential frames of visual data in the new set of frames of visual data." As stated in Applicants' specification at page 24, lines 5-13:

[A]t particular points ("branch points") within [a] set of frames of visual data, further display of active images can continue using the frames of that set of frames of visual data or using the frames of a different set of frames of visual data. If the latter is chosen (either automatically or at the instruction of a user), the active display continues using a frame of visual data corresponding to a predefined point (also referred to as a "branch point") within that set of frames of visual data.

As can readily be appreciated, the Examiner has not in any way indicated how Kumar et al. teach or suggest the use of a branch

point as recited in Claim 13. In fact, since, as discussed above, Kumar et al. do not teach or suggest the generation of an active display, Kumar et al. clearly do not teach or suggest the use of a branch point as a mechanism for switching between different active displays, as in Claim 13.

Regarding Claims 14 and 19, the Examiner stated:

Kumar teaches (Fig. 2, Element 204) that each overlapping section, of an image, is updated by the new image.

The fact that images can be displayed, while being produced, suggests that an active image is produced in real time.

The Examiner's statement that "Kumar teaches (Fig. 2, Element 204) that each overlapping section, of an image, is updated by the new image" indicates a misunderstanding of the teaching of Kumar et al. Fig. 2 of the Kumar et al. patent (and the associated description) does not concern updating an image. Rather, Fig. 2 depicts (among other things) an image mosaic 204. As stated by Kumar et al. at column 5, lines 23-26, "[t]he system aligns the images and combines them to form an image mosaic 204, e.g., a two-dimensional mosaic having the images aligned along an arbitrary parametric surface extending through all the images." Further, since, as discussed above, Kumar et al. do not teach or suggest the display of a context image as in Applicants' invention, Kumar et al. clearly do not teach or suggest that "content of a context image that overlaps content of an earlier context image replaces the content of the earlier context image," as recited in Claim 14, or that "content of a context image that overlaps content of an earlier-displayed context image replaces

the content of the earlier-displayed context image," as recited in Claim 19. Additionally, the Examiner's statement that "[t]he fact that images can be displayed, while being produced, suggests that an active image is produced in real time" is irrelevant to Claims 14 and 19.

Regarding Claims 21 and 22, the Examiner stated:

Although Claims 21-22 do not disclose user interaction, or image designation, by a user, they do refer to displaying context images, in a specific manner. It is therefore implied, that these displays could not take place, without instruction, and are rejected, for the same reasons as Claims 5-12.

Displaying an image in a specific manner does not in any way imply that such display could not take place without user instruction. The reasoning given in the Office Action for the rejection of Claims 5-12 is irrelevant to the patentability of Claims 21 and 22. Claim 21 recites that "all of the images displayed after a first display of a context image are displayed as context images" and Claim 22 recites that "less than all of the images displayed after a first display of a context image are displayed as context images." The Examiner has not addressed the particular limitations recited in Claims 21 and 22, and, in particular, has not shown how Kumar et al. teach or suggest such limitations.

In view of the foregoing, it is requested that the rejection of Claims 1-24 under 35 U.S.C. § 102 be withdrawn.

New Claims

Claim 25 has been added. Support for Claim 25 can be found in Applicants' specification at, for example, page 25, lines 13-18. Claim 25 depends directly on Claim 13 and indirectly on Claim 1, and is therefore allowable over the teaching of Kumar et al. for at least the reasons given above with respect to those claims. Further, Kumar et al. neither teach nor suggest the use of a branch point to switch between active displays representing a panoramic region at different times, as in Claim 25.

CONCLUSION

Claims 1-24 were pending and were rejected. Claims 1, 23 and 24 have been amended. Claim 25 has been added. In view of the foregoing, it is requested that Claims 1-25 be allowed. If the Examiner wishes to discuss any aspect of this application, the Examiner is invited to telephone Applicants' undersigned attorney at (408) 945-9912.

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231, on November 30, 2001.

11-30-01 David R. Graham
Date Signature

Respectfully submitted,

David R. Graham
David R. Graham
Reg. No. 36,150
Attorney for Applicants



Version with Markings to Show Changes Made

Additions are underlined, deletions are enclosed in brackets)

In the specification:

The paragraph beginning at page 4, line 32 has been amended as follows:

In another embodiment of the invention, one or more images are designated by a user and displayed as context image(s). For example, as active images are displayed, the user can designate particular active images to be context [image] images.

Typically, in this embodiment, less than all of the images displayed after a first display of a context image are included in the context display.

The paragraph beginning at page 17, line 2 has been amended as follows:

The set of frames of visual data used to produce the visual display shown in FIGS. 1-3 (or, more generally, any set of frames of visual data used to produce a visual display according to the invention) can be used in a different manner to produce a visual display according to the invention that is similar to, but different [than] from, the visual display shown in FIGS. 1-3. Such a visual display includes a fixed context display that includes content from all parts of the panoramic region from which images were obtained, i.e., the context display is produced from all of the frames of the set of frames of visual data. Such a context display can be produced by displaying content at each

part of the context display that is the content from the temporally latest frame of visual data that includes content at that part of the panoramic region. (Alternatively, some other rule for mediating among overlapping frames of visual data could be used, such as using the content from the temporally earliest frame of visual data.) Such a context display can also be produced by blending the overlapping parts of the frames of visual data, as discussed elsewhere herein. An active display is generated and displayed as discussed above, the active display appearing to be seamlessly integrated within a larger static panorama (the context display).

The paragraph beginning at page 24, line 16 has been amended as follows:

As illustrated in FIG. 9, context images generated from a set of frames of visual data that is different [than] from the set of frames of visual data being used to generate the active image remain as part of the visual display. (In FIG. 9, the context images to the left of location 901 and to the right of location 902 are from panoramic regions that are different [than] from the panoramic region from which the images, including the active image, between the locations 901 and 902 are taken.) However, a visual display in which transition is made at a branch point from one set of frames of visual data to another set of frames of visual data can be implemented in other ways. For example, switching from one set of frames of visual data to another set of frames of visual data may cause all images from

the previous set of frames of visual data to be removed from the visual display. Or, in an embodiment of the invention in which a fixed context display is generated from all of the frames of a set of frames of visual data (as described above), switching to a new set of frames of visual data at a branch point can cause display of a new fixed context display that is generated from all of the frames of the new set of frames of visual data.

In the claims:

Claims 1, 23 and 24 have been amended as follows:

1. (Amended) A method for producing a visual display of a panoramic region from a set of temporally sequential frames of visual data, each frame of visual data representing an image defining a region within the panoramic region such that at least two of the images define regions that do not coincide, the method comprising the steps of:

[generating a display of an] displaying a series of
active [image] images generated from [each of] multiple
temporally sequential frames of visual data;

positioning each displayed image on a display screen
with respect to the position of other displayed images on
the display screen in accordance with the spatial
relationship in the panoramic region of the content of the
displayed image to the content of the other displayed
images; and

displaying one or more context images while an active image is displayed, each context image being at least part of an image represented by a frame of the set of temporally sequential frames of visual data.

23. (Amended) A system for producing a visual display of a panoramic region from a set of temporally sequential frames of visual data, each frame of visual data representing an image defining a region within the panoramic region such that at least two of the images define regions that do not coincide, the system comprising:

means for [generating a display of an] displaying a series of active [image] images generated from [each of] multiple temporally sequential frames of visual data;

means for positioning each displayed image on a display screen with respect to the position of other displayed images on the display screen in accordance with the spatial relationship in the panoramic region of the content of the displayed image to the content of the other displayed images; and

means for [causing the display of] displaying one or more context images while an active image is displayed, each context image being at least part of an image represented by a frame of the set of temporally sequential frames of visual data.

24. (Amended) A computer readable storage medium on which is stored one or more computer programs for producing a visual display of a panoramic region from a set of temporally sequential frames of visual data, each frame of visual data representing an image defining a region within the panoramic region such that at least two of the images define regions that do not coincide, the one or more computer programs comprising:

instructions for [generating a display of an]
displaying a series of active [image] images generated from
[each of] multiple temporally sequential frames of visual
data;

instructions for positioning each displayed image on a display screen with respect to the position of other displayed images on the display screen in accordance with the spatial relationship in the panoramic region of the content of the displayed image to the content of the other displayed images; and

instructions for displaying one or more context images while an active image is displayed, each context image being at least part of an image represented by a frame of the set of temporally sequential frames of visual data.

Claim 25 has been added as follows:

25. (New) A method as in Claim 13, wherein:

the set of frames of visual data in which a branch point is identified is a first set of temporally sequential

frames of visual data representing a panoramic region at a first time; and

the new set of frames of visual data is a second set of temporally sequential frames of visual data representing the panoramic region at a second time that is different from the first time.